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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,159	04/02/2004	David Russell	ZCO-101	1167

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EXAMINER

EWALD, MARIA VERONICA

ART UNIT	PAPER NUMBER
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1722

DATE MAILED: 10/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/817,159	Applicant(s) RUSSELL ET AL.	
	Examiner Maria Veronica D. Ewald	Art Unit 1722	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
 4a) Of the above claim(s) 27-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>6/4-3/6</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

13. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-26, drawn to apparatus for fabricating a three-dimensional object, classified in class 425, subclass 375.
- II. Claims 27-42, drawn to method for fabricating a three-dimensional object, classified in class 264, subclass 308.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process, namely a process wherein a curing step is added.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation between Examiner Lawrence Lambert and Atty. John Forcier on September 11, 2006, a provisional election was made without traverse to prosecute the invention of Group I, claims 1-26. Affirmation of this election must be

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made by applicant in replying to this Office action. Claims 27-42 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 – 3, 5 – 6, 10 – 14, 16 – 20 and 22 – 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Feygin, et al. (U.S. 5,637,175). Feygin, et al. teach an apparatus for fabricating a three-dimensional object from a representation of the object stored in memory, the apparatus comprising: a rotary table for receiving successive layers of a build material (item 39 – figure 10; column 24, lines 45 – 50); and an array of at least one printhead disposed above the build table (item 28 – figure 10; column 24, lines 45 – 50); wherein the rotary table rotates continuously (column 24, lines 45 – 50); wherein there is a storage means for holding the building material (item

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12 – figure 10); and a conveying means for delivering the build material to the build table (item 12 – figure 10).

With respect to claims 5 – 6, Feygin, et al. further teach that there is a spreader for distributing the build material over at least a portion of the build table (item 3 – figure 10); wherein the spreader comprises a counter-rotating roller (item 3 – figure 10; column 12, lines 45 – 46; column 24, lines 45 – 55).

With respect to claims 10 – 14, the reference further teaches that the array prints an entire surface of the build table by continuous consecutive radial scanning motions (column 24, lines 49 – 52; column 25, lines 30 – 43); wherein the array is configured to dispense fluid at substantially any radial location of the rotary build table without adjustment (column 24, lines 49 – 52; column 25, lines 30 – 43); wherein the array can be adjusted incrementally radially (column 25, lines 30 – 43); wherein the array can be displaced from a normal printing position for servicing (figures 2 and 10); wherein the array can be displaced radially with respect to the rotary build table (column 25, lines 30 – 43).

With respect to claims 16 – 20, Feygin, et al. teach that the apparatus defines an opening for removing the three-dimensional object (column 26, lines 20 – 30); wherein the three-dimensional object is removed through a top opening of the build table (figures 23 – 24); wherein the apparatus is further comprised of a sensor to monitor at least one performance characteristic of the apparatus, wherein the characteristic is selected from the group consisting of print quality, printing errors, print speed, printhead condition, build material quantity, and table position (column 30, lines 40 – 50); wherein the

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operation of the apparatus is modified in response to a signal received from the sensor (column 30, lines 40 – 50); wherein the array is movable in response to the signal from the sensor (column 30, lines 40 – 45).

With respect to claims 22 – 26, Feygin, et al. teach an apparatus for fabricating a three-dimensional object from a representation of the object stored in memory, the apparatus comprising: a generally circular build table for receiving successive layers of a build material (item 39 – figure 10); and an array of at least one printhead disposed above the build table and movable relative to the build table (item 28 – figure 10; column 25, lines 35 – 40); wherein the array is movable over at least a portion of a build surface defined by the generally circular build table (figure 16; column 25, lines 30 – 40); wherein the array is configured to dispense fluid at substantially any radial location of the build table by moving the array radially to the desired location (column 25, lines 30 – 40); wherein the array moves continuously above the build table (column 25, lines 35 – 40); wherein the generally circular build table is movable in a vertical direction (column 24, lines 30 – 40, 60 – 65).

Claims 1 – 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Lewis (U.S. 5,837,960). Lewis teaches an apparatus for fabricating a three-dimensional object from a representation of the object stored in memory, the apparatus comprising: a rotary table for receiving successive layers of a build material (item 5 – figure 1); and an array of at least one printhead disposed above the build table (item 41 – figure 1); wherein the rotary table rotates continuously (column 7, lines 5 – 45); wherein there is a storage

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means for holding the building material (item 10 – figure 1); and a conveying means for delivering the build material to the build table (item 1 – figure 1).

Claims 22 – 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Yanagisawa, et al. (U.S. 2002/0047229 A1). Yanagisawa, et al. teach an apparatus for fabricating a three-dimensional object from a representation of the object stored in memory, the apparatus comprising: a generally circular build table for receiving successive layers of a build material (paragraph 0081); and an array of at least one printhead disposed above the build table and movable relative to the build table (paragraphs 0087 – 0089); wherein the array is movable over at least a portion of a build surface defined by the generally circular build table (paragraphs 0087 – 0089); wherein the array is configured to dispense fluid at substantially any radial location of the build table by moving the array radially to the desired location (paragraphs 0087 – 0089); wherein the array moves continuously above the build table (paragraphs 0088 – 0089); wherein the generally circular build table is movable in a vertical direction (paragraph 0034).

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin, et al. in view of Tochimoto, et al. (U.S. 6,612,824). Feygin, et al. teach the characteristics previously described but do not teach that there are two storage containers for holding at least two build material components and a blender for mixing the components.

In a method to fabricate a three-dimensional object, Tochimoto, et al. teach that there are at least two storage tanks for holding thermoplastic material used to either mold the object or support the object (column 14, lines 10 – 15). The resin may or may not be colored, depending on the product characteristics desired. In addition, there are nozzles attached to a driving unit to dispense the resin onto the build platform (figure 1; column 14, lines 20 – 27). This allows a blending of colored resin to be jetted or uncolored resin to be jetted, depending on the color information stored and the object's final fabrication. This reads on the Applicant's claim that there are at least two storage chambers for holding at least two build material components separate from each other; and a blender for mixing the build material components in a predetermined ratio for delivery to the build table.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Feygin, et al. to incorporate the multiple storage tanks and blender of Tochimoto, et al. for the purpose of mixing the resins prior to delivery depending on the object's final characteristics desired.

Claims 7 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin, et al. in view of Schmidt (U.S. 6,841,116). Feygin, et al. teach the

characteristics previously described but do not teach that the counter-rotating roller is skewed with respect to the rotary build table allowing excess material to migrate to the edge and that there is a sensor disposed below the build table to detect the amount of excess material.

In a method to fabricate a three-dimensional object, Schmidt teaches the use of a build table on which layers of material are deposited. A planarizer or roller (item 32 – figure 1) is used to smooth over the layers once deposited. As such, the excess material not adhering to the laminate accumulates on the planarizer, is directed to the edge of the build table and contacts a skive which directs the excess material to a waste reservoir (column 16, lines 50 – 60). In addition, there is a sensor which detects the waste or excess material to adjust the delivery of material to the dispensing device and thus, to the build table (column 17, lines 10 – 17). This reads on the Applicant's claims that the counter-rotating roller is skewed with respect to a radius of the rotary build table to induce excess build material to migrate over an edge of the build table; wherein there is sensor disposed below the edge of the build table to detect an amount of the excess build material and wherein an amount of build material delivered to the build table is adjusted in response to the amount of excess build material detected.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Feygin, et al. to incorporate the sensor of Schmidt for the purpose of detecting the excess material and adjusting the amount of material dispensed from the containers to the build table, as taught by Schmidt.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin, et al. in view of Gothait (U.S. 6,658,314). Feygin, et al. teach the characteristics previously described but do not teach that there are redundant printheads.

In a method to produce a three-dimensional object via a system using a plurality of printheads and a build table, Gothait teaches that the printheads are capable of replicating or printing the same material depending on the information fed to the process controller (column 5, lines 20 – 30; column 6, lines 30 – 65). This allows a redundant system, such that if one or a group of printheads fails, another group can continue the layer building without disruption. This reads on the Applicant's claim that the apparatus be comprised of redundant printheads.

Thus, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the apparatus of Feygin, et al. such that the printheads are redundant for the purpose of allowing the object to be built layer-by-layer, even if one printhead fails and needs to be repaired.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Feygin, et al. in view of EOS GmbH (DE 299 07 262). Feygin, et al. teach the characteristics previously described but do not teach that there are a plurality of rotary build tables.

In a method to fabricate more than one three-dimensional object at the same time, via layerwise deposit of material, EOS GmbH teach the use of a chamber with at least two platforms (items 21 and 21' – figure 1) on which two separate objects can be produced at the same time (items 50 and 50' – figure 1). The apparatus is further

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comprised of a dispenser to dispense powder layerwise onto the respective platforms (item 10 – figure 1), a wiper for smoothing the layers and an irradiation device to cured desired spots on the object (item 7 – figure 1). This reads on the Applicant's claims that there are a plurality of rotary build tables.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to configure the apparatus of Feygin, et al. to have a plurality of rotary build tables as that taught by EOS GmbH for the purpose of fabricating more than one object at the same time.

Conclusion

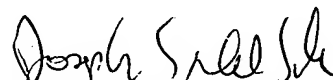
16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Veronica D. Ewald whose telephone number is 571-272-8519. The examiner can normally be reached on M-F, 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Yogendra Gupta can be reached on 571-272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MVE


JOSEPH S. DEL SOLE
PRIMARY EXAMINER
10/12/06